

began to break up, and disappeared in faculæ on the 13th. None others seen.

Mr. M. A. Veeder, Lyons, N. Y.: on March 4th a large spot, unusually far north on the sun's surface, appeared by rotation. On succeeding days it divided into several parts, and by March 13th had nearly faded out. Faculæ in its location reappeared by rotation on March 31st. On March 7th faculæ appeared by rotation and made the entire transit, being seen at the western limb on March 20th. On March 19th a group of faculæ was about two days removed from the eastern limb. The groups of faculæ of March 7th and 19th were in the location of areas that have long been much disturbed, and whose

return at the eastern limb have been attended by the chief magnetic storms of recent years, manifesting at times for months together a very exact twenty-seven day periodicity. There has been a similar reoccurrence of magnetic perturbations associated with the area occupied by the spot of March 4th continuing however since August, 1889, only.

Mr. John W. James, Riley, Ill.: a small group surrounded by very prominent faculæ, on the eastern edge of the sun, 4th, very changeable in appearance, daily, and vanished 13th, before reaching the western edge. None others seen.

Mr. H. D. Govey, North Lewisburgh, Ohio: sun spots were observed on the 9th.

VERIFICATIONS.

FORECASTS FOR 24 HOURS IN ADVANCE.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

The forecasts for districts east of the Rocky Mountains for March, 1890, were made by Captain James Allen, 3d Cavalry, Signal Officer, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps.

Percentages of forecasts verified, March, 1890.

States.		States.	
Maine.....	81.4	Kentucky.....	83.9
New Hampshire.....	83.5	Ohio.....	74.5
Vermont.....	84.2	West Virginia.....	79.7
Massachusetts.....	84.8	Indiana.....	77.4
Rhode Island.....	82.4	Illinois.....	82.8
Connecticut.....	84.1	Lower Michigan.....	82.1
Eastern New York.....	83.4	Upper Michigan.....	79.5
Western New York.....	75.2	Wisconsin.....	82.1
Eastern Pennsylvania.....	81.5	Minnesota.....	79.4
Western Pennsylvania.....	73.9	Iowa.....	78.6
New Jersey.....	84.4	Kansas.....	75.2
Delaware.....	91.5	Nebraska.....	80.5
Maryland.....	90.6	Missouri.....	82.6
District of Columbia.....	89.0	Colorado.....	71.7
Virginia.....	86.0	North Dakota.....	77.4
North Carolina.....	85.9	South Dakota.....	81.4
South Carolina.....	82.2	Southern California*.....	82.1
Georgia.....	83.7	Northern California*.....	82.8
Eastern Florida.....	78.1	Oregon*.....	75.9
Western Florida.....	86.3	Washington*.....	78.4
Alabama.....	84.8	By elements: Weather.....	82.1
Mississippi.....	81.9	Temperature!.....	81.5
Louisiana.....	80.8	Monthly percentage of weather and	
Texas.....	81.1	temperature combined †.....	81.9
Arkansas.....	82.3		
Tennessee.....	86.2		

* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The forecasts of temperature in districts east of the Rocky Mountains for March, 1890, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. ‡ The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

FORECASTS FOR 48 AND 72 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public the Chief Signal Officer has authorized forecasts for forty-eight and seventy-two hours, covering the second and third days in advance. Such forecasts are

optional with the predicting officer, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 195; temperature, 132. Percentages of verifications: weather, 78.5; temperature, 94.2. Weather and temperature combined, 83.3. For third day in advance. Number of predictions made: weather, 7; temperature, 34. Percentages of verifications: weather, 82.9; temperature, 86.5; weather and temperature combined, 85.6.

CAUTIONARY SIGNALS FOR MARCH, 1890.

Statement showing percentages of justifications of wind signals for the month of March, 1890:

Wind signals.—(Ordered by Captain James Allen.) Total number of signals ordered, one hundred and ten; justified as to velocity, wholly, seventy-seven, partly, eight; justified as to direction, one hundred and two. Of the signals ordered, seventy-two were cautionary signals, of which fifty were wholly, and four partly justified, and thirty-eight were storm signals, of which twenty-seven were wholly, and four partly justified. Forty-nine signals were ordered for easterly winds, of which forty-four were justified, and sixty-one were ordered for westerly winds, of which fifty-eight were justified. Percentage of justifications, 71.6.

Gold-wave signals.—(Ordered by Assistant Professor T. Russell.) Total number of signals ordered, seventy-four; justified, twenty-nine. Percentage of justifications, 39.2.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for March, 1890.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Illinois.....	81.0	78.2	New Jersey.....	84.7	92.3
Indiana.....	85.0	88.0	New York.....	84.3	87.3
Kansas.....	82.7	86.6	North and South Dakota....	82.0	84.0
Michigan.....	84.4	82.9	Ohio.....	80.0	85.0
Minnesota.....	69.0	82.0	Pennsylvania.....	82.0	85.0
Missouri.....	80.0	85.0	South Carolina.....	83.6	91.4
Nebraska.....	79.9	86.6	Tennessee.....	84.7	86.6

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for March, 1890, of the directors of the various state weather services:

ALABAMA.

Temperature.—The average temperature was 1.08 below the normal; highest monthly mean, 58.4, at Citronelle; lowest monthly mean, 47.8, at Valley Head; maximum, 84, at Citronelle, 19th, Montgomery, 21st, and at Wiggins, 20th and 26th; minimum, 10, at Valley Head, 2d; greatest local monthly range, 64, at Uniontown, Valley Head, and Wiggins; least local monthly range, 50, at Union Springs.

Precipitation.—The average was 0.66 below the normal; greatest monthly, 9.67, at Carrollton; least monthly, 2.09, at Bermuda.

Wind.—Prevailing direction, north.—P. H. Mell, Signal Corps, Auburn, director.

ARKANSAS.

Temperature.—The mean temperature was about 2 above the normal; highest monthly mean, 54.7, at Pine Bluff; lowest monthly mean, 44.9, at Wins-